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OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, L.L.P.				
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EXAMINER				
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ART UNIT		PAPER NUMBER		
1795				
NOTIFICATION DATE		DELIVERY MODE		
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

10/805,770

Applicant(s)

DURR ET AL.

Examiner

Xiuyu Tai

Art Unit

1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 March 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 4, 6-13, 15-18 and 20-35 is/are pending in the application.
- 4a) Of the above claim(s) 25-34 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 4, 6-13, 15-18, 20-24 and 35 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 3/29/2010 has been entered.

Response to Arguments

2. Due to applicant's amendment, rejections to claims 4, 8, and 9 under 35 U.S.C. 112, second paragraph are withdrawn.

3. Applicant's arguments with respect to claims 1, 4, 6-13, 15-18, 20-24, and 35 have been considered but are moot in view of the new ground(s) of rejection necessitated by applicant's amendment.

Drawings

4. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "the film includes at least three layers" must be shown or the feature(s) canceled from the claim(s). No new matter should be entered. Figure 8 shows two-layered film structure. No other drawings illustrate three-layered structure.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended

replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claim 4 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
7. Claim 4 recites the limitation of "a first kind of particles of one average diameter" in line 2 and "a second kind of particles having a larger average diameter". Since claim 1 recites the same limitation, it is not clear if they (the limitations in claims 1 and 4) are the same or different. Appropriate correction is required.

8. Claims 12 and 13 recite the limitation of "a second kind of particles" in line 2. Since claim 1 recites the same limitation, it is not clear if they (the limitations in claims 1 and 12/13) are the same or different. Appropriate correction is required.
9. Claim 15 recites limitations of (i) "a first kind of particle of one average diameter" in line 2; (ii) "a second kind of particles" in line 3; and (iii) "a second kind of particles" in line 4. Since claim 1 recites the same limitation, it is not clear if they (the limitations in claims 1 and 12/13) are the same or different. In addition, the claim language does not distinguish between (ii) and (iii). Appropriate correction is required.
10. Claims 17 and 18 recite the limitation of "a first kind of particles" in line 2. Since claim 1 recites the same limitation, it is not clear if they (the limitations in claims 1 and 17/18) are the same or different. Appropriate correction is required.

Claim Rejections - 35 USC § 102

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

12. Claims 1, 4, 6 -11, and 20-24 are rejected under 35 U.S.C. 102(b) as being anticipated by Chiba et al (PG-PUB US 2002/0134426).
13. Regarding claim 1, Chiba et al disclose a dye-sensitized solar cell comprising a porous semiconductor layer having a multi-layer structure (ABSTRACT). A porous layer 3 (i.e. a film) for a solar cell has a first porous layer 4 at the light-receiving surface (i.e. a front surface) and a second porous layer 5 at the surface away from the light-receiving

surface (i.e. a back surfaces, Figure 1, paragraph [0023]), wherein the first layer comprises uniform small particles having a diameter (i.e. a first kind of particles) of 20 nm to suppress light scattering (paragraphs [0033] & [0077]) and the second layer comprises a primary particle having a diameter of 20 nm (i.e. the first kind of particles) and a secondary particles having a diameter up to several micron (i.e. a second kind of particles with larger diameter, paragraph [0035]). Chiba also teaches that the first layer (i.e. the front surface) scatters light as little as possible while the second layer (i.e. the back surface) has larger particles to scatter more light (i.e. a gradient of light scattering strength from front to back surface, paragraph [0030] – [0031]). It is preferred that the light is not scattered by the first layer (i.e. zero light scattering strength at the front surface, paragraph [0031]).

14. Regarding claim 4, the reference teaches that the porous layer has a multi-layer structure including first, second, and subsequent layers (i.e. at least three layers, paragraph [0033]). The first layer has small primary particles while the second and the subsequent layer may have larger particles containing small primary particles and secondary large particles (i.e. each layer having small particles, paragraph [0034]).

15. Regarding claim 6, the particles in the first and the second layers have different diameters, implying sphere-shaped particles (paragraph [0030]).

16. Regarding claim 7, the porous layer 3 may contain semiconductor material (paragraph 0026)).

17. Regarding claim 8, the first layer 4 and the second layer 5 are adjacent each other (Figure 1) and are applied subsequently (Examples 1-12)

18. Regarding claim 9, the first layer 4 and the second layer 5 are applied subsequently by various methods (Examples 1-12). The layer is coated by doctor blading method (Examples 1-12). The claim contains product (the film) by process (screen printing, doctor blading...). Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process (*In re Thorpe* and MPEP § 2113).
19. Regarding claim 10, the reference teaches that the first layer may contain the particles with a primary diameter of 20 nm (paragraph [0077]).
20. Regarding claim 11, the second layer may contain the particles with a particle diameter about 180 nm (paragraph [0081]).
21. Regarding claim 20, the porous layer 3 of Chiba is used in a dye-sensitized solar cell (i.e. an electronic device, Figure 1, paragraph [0023]).
22. Regarding claim 21, the porous layer 3 of Chiba is used in a dye-sensitized solar cell (Figure 1, paragraph [0023]).
23. Regarding claim 22, the dye-sensitized solar cell of Chiba includes a counter electrode layer to reflect light (Figure 1, paragraph [0064]).
24. Regarding claim 23, the dye-sensitized solar cell of Chiba includes an electro-conductive film 2 to allow light transmit within the solar cell (Figure 1, paragraph [0024]).

25. Regarding claim 24, the dye-sensitized solar cell of Chiba includes a hole transporting layer 6 containing an electrolyte (Figure 1, paragraph [0023] & [[0065]).

Claim Rejections - 35 USC § 103

26. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

27. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

28. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

29. Claims 12, 13, 15-18, and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chiba et al (PG-PUB US 2002/0134426) as applied to claim 1 above.

30. Regarding claims 12 and 13, Chiba does not specifically teach the claimed volume ratio/weight ratio of the first kind of particles to the second particles of particles. However, Chiba indicates that the haze ratio of the porous layer can be controlled by changing the mixing ratio of particles having different diameters and by changing the particle diameter (paragraph [0034]) and the change of haze ratio can improve the performance of the solar cell (paragraph [0012]). Therefore, it would be obvious for one having ordinary skill in the art to optimize the mixing ratio (i.e. a volume ratio/weight ratio) of particles having different diameters in order to improve the efficiency of the solar cell of Chiba.

31. Regarding claim 15, Chiba teaches that the porous layer has a multi-layer structure including first, second, and subsequent layers (i.e. a plurality of layers, paragraph [0033]). The first layer has small primary particles while the second and the subsequent layer may have larger particles containing small primary particles and secondary large particles (i.e. each layer having the first kind of particles and the first layer having no the second kind of particles, paragraph [0034]), but Chiba does not specifically. However, Chiba indicates that the haze ratio of the porous layer can be controlled by changing the mixing ratio of particles having different diameters and by changing the particle diameter (paragraph [0034]) and the change of haze ratio can improve the performance of the solar cell (paragraph [0012]). Therefore, it would be obvious for one having ordinary skill in the art to optimize the particle sizes and the

mixing ratio of particles having different diameters in order to improve the efficiency of the solar cell of Chiba.

32. Regarding claim 16, Chiba indicates that the haze ratio of the porous layer can be controlled by changing the mixing ratio of particles having different diameters and by changing the particle diameters (paragraph [0034])

33. Regarding claim 17, Chiba teaches that the first layer 4 having small particles is close the front surface of the porous layer 3 (Figure 1, paragraph [0023]).

34. Regarding claim 18, Chiba teaches that the first layer 4 having small particles is close the light receiving surface (i.e. the front face) of the solar cell (Figure 1, paragraph [0023]).

35. Regarding claim 35, Chiba does not specifically disclose the filing having continuous scattering gradient. However, Chiba indicates that the haze ratio of the porous layer can be controlled by changing the mixing ratio of particles having different diameters and by changing the particle diameter (paragraph [0034]) and the change of haze ratio can improve the performance of the solar cell (paragraph [0012]). Therefore, one having ordinary skill in the art would have realized to change the scattering strength continuously along the film by varying particle size and amount present in the film in order to improve conversion efficiency of the solar cell of Chiba..

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Xiuyu Tai whose telephone number is 571-270-1855. The examiner can normally be reached on Monday - Friday, 8:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on 571-272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/X. T./
Examiner, Art Unit 1795

/Alexa D. Neckel/
Supervisory Patent Examiner, Art Unit 1795